Are You Ready to Call the Guinness Book of Records?

Brief Overview:

Collecting, displaying, and interpreting data has become a part of life in our fast paced technological world. In the following lessons students will be responsible for gathering and displaying data in a line plot. They will find two measures of central tendency according to the data. Students will work as a whole class, in groups, pairs, and individually.

NCTM Content Standard/National Science Education Standard:

1. **Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.**
    - **Collect data using observations, surveys, and experiments.**
    - **Represent data using tables and graphs such as line plots, bar graphs, and line graphs.**
2. **Select and use appropriate statistical methods to analyze data.**
    - **Use measures of center, focusing on the median, and understand what each does and does not indicate about the data set.**

Grade/Level:

Grades 3-4

Duration/Length:

3 days (60 minutes each day)

Student Outcomes:

Students will:

- **Collect data by conducting surveys to answer a question.**
- **Interpret line plots.**
- **Determine median, mode, and range.**

Materials and Resources:

Lesson 1

- **Student Resource 1: Anticipation Guide**
- **Student Resource 2: Graph Paper**
- **Student Resource 3: Examples of Line Plots Missing/ Incorrect Elements**
- **Student Resource 4: Exit Sticky**

- **Students Resource 5: Collecting Data About Sleep**
- **Teacher Resource 1: Sample Line Plot of Jumping Jacks**
- **Teacher Resource 2: Examples of Line Plots Missing/ Incorrect Elements Answer Key**
- **Teacher Resource 3: Answer Key for Exit Sticky**
- **Teacher Resource 4: Records Held in 15 Minutes**
- **Teacher Resource 5: Line Plot Observational Checklist**
- **2 Sticky Notes for each student**

Lesson 2

- **Student Resource 6: Talking About Data Pre Assessment**
- **Student Resource 7: Independent Practice**
- **Student Resource 8: Identifying the Mode and the Range**
- **Teacher Resource 6: Talking About Data Pre Assessment Answer Key**
- **Teacher Resource 7: Literature to Engage About Records**
- **Teacher Resource 8: Animal Sleep Chart.**
- **Teacher Resource 9: Identifying the Mode and Range Answer Key**
- **Judy Clocks**
- **Index cards**

Lesson 3

- **Student Resource 9: Data Cards**
- **Student Resource 10: Clothes Pin Data**
- **Student Resource 11: Identifying the Median**
- **Student Resource 12: Identifying the Median with an Even Data Set**
- **Student Resource 13: Summative Assessment**
- **Teacher Resource 10: Independent Practice Answer Key**
- **Teacher Resource 11: Smartie Data Paper Pencil Strategy**
- **Teacher Resource 12: Data Card for Extension**
- **Teacher Resource 13: Smarties World Record**
- **Teacher Resource 14: Clothes Pin Challenge**
- **Teacher Resource 15: Identifying the Median Answer Key**
- **Teacher Resource 16: Identifying the Median with an Even Data Set Answer Key**
- **Teacher Resource 17: Summative Assessment Answer Key**
- **Scissors**
- **Clothes Hanger and Wooden Clothes Pins**

Development/Procedures:

Lesson 1

Pre-Assessment/Launch – Collect Data and Create Class Line Plot

- **Before the students enter the room, create a line plot on the board with the range of 2-15. Do not include a title or labels. This will be completed later on during the lesson.**
- **As students enter the room, give each student a sticky note and have him or her write an answer to the question: How many letters are in your last name?**
- **Once the students write their answers, have them approach the board and place the sticky notes above the number that correlates with their answers.**
- **Informally observe whether or not the students are able to place their answer above the number that correlates with their answer.**
- **After they have placed their answers on the board, say: I wonder if there is a World Record held for the most letters in a last name? Over the next three days we are going to learn about a few World Records from the Guinness Records. We will collect data and conduct experiments to see how we compare to record holders. If you have reference material available displaying world records, keep the materials available for students during independent reading time.**
- **Distribute** Student Resource 1 Anticipation Guide **and read aloud each statement. Have students decide if each is true or false. Model how to record their answers in the "Before" column. Inform students they will return to the anticipation guide at the end of our world record exploration to find out if their predictions were correct or incorrect. Collect anticipation guides.**
- **Return to the data on the board. Ask: How did you know where to put your answer on the number line? Students should explain the data ascends vertically above each number on the line. His or her mark should be placed above the number that correlates with their answer.**
- **After all students have placed their answers on the line plot, use the Think, Pair, and Share strategy to brainstorm and create a list of elements that are missing from the line plot.**

Teacher Facilitation

- **Key Question:** *What elements are missing from the line plot?* **Elicit responses from the students and record answers on chart paper.**
- **Introduce and impress an acronym T.A.I.L.S. Explain these are all of the elements needed to create a graph! (You may choose to use an alternative mnemonic device to help students learn the essential elements of a line plot. One example is T.A.L.K – Title, Axis, Label, Key, if necessary.) See Teacher Resource 1.**
- **Share with them: T stands for <u>Title</u>. Every graph must have a title! With the students create a title for the line plot such as "Number of Letters in Our Last Names". Have a student write the title on a sentence strip and place this above the number line.**

- **Share: A stands for <u>Axis</u>. Point out a line plot has one axis that is an actual part or fraction of the number line! It does not have to begin with zero and represents a piece or portion of the number line.**
- **Share: I stands for <u>Increments</u>. In this case 2-15 are our increments. These numbers should go in sequential order!**
- **Share: L stands for <u>Labels.</u> The label should be placed under the number line and should explain what the values represent. Ask: What do these numbers represent? Take suggestions and answer that they are measuring the number of letters in a last name. Have a student create a label "Number of Letters" on a sentence strip and place under the number line.**
- **Share: S stands for <u>Spacing</u>. Explain that when a line plot is created the increments need to be equally spaced along the number line. For example, with an equal space between each number.**
- **Have students verbally summarize the elements of a line plot by explaining to a partner aloud that all line plots must include a title, sequential numbers along a number line, a labeled number line, and marks that represent each piece of data.**

Student Application

- **Ask: How many Jumping Jacks do you think a World Record holder can do in 30 seconds? How many Jumping Jacks do you think you can do in 30 seconds? Have students record their predictions in their math notebooks/journal. Display** Teacher Resource 4 Jumping Jack Record Held 15 Minutes! **Challenge students to help you determine about how many Jumping Jacks the record holder would probably be able to do in 30 seconds.**
- **Explain to students that they are going to be conducting an experiment to find out exactly how many jumping jacks they can do in thirty seconds.**
- **Distribute one sticky note for each student.**
- **Have students pair up and name the first group A and the second group B. Facilitate the experiment by timing group A for thirty seconds as the Bs count for their partners. Switch and have the As count for the Bs. After they have collected their data, have them come up to the board and place their sticky note on the board or you can have the students share their answers out loud and record the results on the board.**
- **Explain that their mission is to take the data that has been collected and create a line plot displaying this data being sure to include all of the line plot elements. (TAILS, TALK, or other mnemonic device)**
- **Distribute** Student Resource 2 Graph Paper**. Students will use the graph paper to create their line plots. Graph paper helps students keep straight rows and Xs.**

- **Observe students as they independently display the class data on line plots.**
- **Students share their line plots in small groups using mathematical language to explain the elements of their line plots.**
- **In preparation for day 2, distribute** Student Resource 5 Homework**. Students will use the data collected at home for tomorrow's lesson.**

Embedded Assessment

- Student Resource 4 - **Exit Ticket**
- Teacher Resource 3 **- Example answer for exit sticky**
- Teacher Resource 5 **- Use the checklist to record how well students are able to take the data and create a line plot including all elements.**

Re-teaching/Extension

- Re-teaching**- Use the data gathered from the checklist to guide your re-teaching. Pull students in small groups and use** Student Resource 3 and Teacher Resource 2 **(answer key) to review T.A.I.L.S. or alternative mnemonic devise with students as needed.**
- Extension- **Students create a second line plot displaying "made-up" data for a rival class' Jumping Jack data. Have students create line plots with missing elements and then switch with partners to identify and correct the missing or incorrect elements.**

Lesson 2 **Pre-Assessment**

- **Distribute** Student Resource 6: Pre-Assessment **for Day 2.**
- **Give students time to complete the pre-assessment and then collect. This will be redistributed at the end of the lesson as the formal assessment.**

Launch

- **Ask: Which animal do you think holds the record for sleeping the longest in one day? You can give the following choices to narrow guesses: Brown Bat, human infant, Three-Toed Sloth, or Python. Optional review: Take a vote and display the results on a tally chart, pictograph, or in a bar graph.**
- **Display** Teacher Resource 8 Sleeping Chart **to find out which animal holds the record for most hours spent sleeping in one day. Have students compare the data to their predictions.**
- **After sharing** Teacher Resource 8 Sleeping Chart **say: "Sleep patterns change as people age. Newborn babies sleep about 16 hours per day. Older people (50-85 years old) sleep only 5.75 hours per day. About how many hours does a typical fourth grader sleep? According to the National Institute of Health, it is recommended that fourth graders get at least 9 hours of sleep each night.**

- ***You may want to share the following information about this world record: *Randy Gardner* holds the *Guinness World Record* for intentionally having gone the longest without sleep. In 1965, Gardner, then 18, stayed awake for 264 hours (about 11 days) for a high school science project. He experienced significant deficits in concentration, motivation, perception and other higher mental processes during his sleep deprivation. However, he recovered normal cognitive functions after a few nights' sleep.***

Teacher Facilitation

- **Instruct students to take out completed homework** Student Resource 5.
- **Using your own bedtime and wake up time use the "think aloud" strategy and model rounding your bed time and awake time to the nearest hour. Have the students round their bed times and wake times to the nearest hour.**
- **Using your data, use the "think aloud" strategy to model how to figure out the total amount of hours you slept. Have the students calculate the total amount of hours they slept.**
- **Students share and report the data to the class. Record each response on chart paper as each student records on his or her individual homework sheet** Student Resource 5.
- **Distribute an index card to each student and instruct him or her to write down the total amount of hours slept in large writing.**
- **Using masking tape create a line on the ground to be used for a human line plot. Engage the students as you do this. For example, ask: How will I know which number to write first? This is called the minimum.**
- **Without talking, have students approach the line and place themselves in sequential order. Have them identify the minimum, maximum, and range according to their data.**
- **Challenge them to put themselves in the correct locations to form a human line plot of their data.**
- **Ask them to look around and see what they notice about their line plot. Ask them to identify which column has the most people. Ask them: What information does this tell us?"**
- **Explain to them mathematicians use this as one way to measure center and they call it mode. Mode is the number that appears most often in a set of data. Share one-way to remember this is MO in Mode can stand for Most Often.**
- **As students return to their seats, draw the same line plot on the overhead or chalkboard. Model how to draw conclusions for a given set of data.**

Student Application

- **Distribute** Student Resource 7: Independent Practice.

- **Inform them that they will analyze the data from another fourth grade class. They will need to identify minimum, maximum, range, and mode of this data set and complete the BCR.**

Embedded Assessment

- Student Resource 7
- **When finished** Student Resource 7**, redistribute** Student Resource 6 **and have students complete the pre-assessment in a different color to see if their knowledge has changed. Emphasize how students should not change answers from the beginning of the lesson. Teachers like to see learning! Tip: Have students complete the pre-assessment using a blue pen and the post-assessment using a green pen. See Teacher Resource 6 for the answer key.**

Re teaching/Extension

- Re-teaching- **Distribute** Student Resource 8 **to students whom need more work with mode and range. Use** Teacher Resource 9 **as the answer key to guide instruction. Include conversations with the students to help students draw conclusions from the different sets of data.**
- Extensions
  1. **Have them research sleep patterns during computer lab time. Students can then write a paragraph explaining whether or not their class is getting enough sleep and use the data to support their answer.**
  2. **Students can keep a sleeping log for a week to draw further conclusions about their own sleeping patterns.**
  3. **Use** Teacher Resource 7 **to create a reading basket filled with literature about sleep and world records. Invite students to read the literature during independent reading time.**

Lesson 3
Pre-Assessment /Launch

- **Engage students with a set of chopsticks and candy. Have them watch while you pick up as many pieces as you can while members of the class time you for one minute.**
- **Ask: If I continued at the same rate, how many Smarties could I pick up in three minutes? If necessary, model a strategy to help students calculate this.**
- **Share this World Record data: Using chopsticks, Kathryn Ratcliffe (UK) ate 170 Smarties in three minutes at the Guinness World Records 2005 Roadshow at The Trafford Centre, Manchester, Lancashire, UK, on 27 November 2004.** (Teacher Resource 13)

- **Ask students to make comparisons to Kathryn's data with your own. Explain to them that they are not going to try this experiment in class but that you encourage them to try it out at home. Tell students that they will engage in a different experiment later on in the lesson.**
- **Display** Teacher Resource 11 Smarties Data. **Explain that this data represents the number of "Smarties" several fourth graders picked up with chopsticks in three minutes and ate them.**
- **Ask: Looking at the following data, can you think of a way to find the exact center or middle of the data so that you are separating the data into two halves? Pair up students and distribute** Student Resource 10 Data Cards.
- **Explain their cards represent the same data seen on** Teacher Resource 11 Smarties Data. **They will cut their cards apart and manipulate them to try to find a way of determining the exact center of the data.**
- **Allow time for students to explore while you circulate and observe different strategies employed by the students.**

Teacher Facilitation

- **When students have come up with a strategy have the pairs share what they did with the class to find the exact center of the data.**
- **Upon completion, introduce the vocabulary "median" to them and explain that this is what mathematicians call the exact center or middle of the data. It separates the data so that half of the data is below the median and half the data is above it.**
- **Model how to find the median by choosing 13 students. Assign each of these students one of the numbers from the** Teacher Resource 11 Smarties Data.
- **Instruct these students to line up in sequential order in the hallway. For review have the minimum step forward and explain why he or she is the minimum. Do the same with the maximum and mode.**
- **Have the maximum lead the line and slowly walk towards the minimum (forming a horseshoe). Have the maximum value face the minimum value. Instruct the remaining students to face the person they are now across from. They should now be in the shape of a horseshoe or a U. The person without a partner represents the exact center of the line and is dubbed Sir Median!**
- **Have the students in line give their number to a student who was not able to participate the first time.**
- **Have these new participants line up in sequential order.**
- **Have the minimum and maximum values take a step back. Have the next two-step back and continue in this pattern until one student is left, the median.**
- **Ask: "Who can now tell me the definition of a median?" Elicit responses.**

Student Application

- **Have students sit down. Tell them that manipulative are not always available and that you are going to show them a "pencil paper" strategy.**
- **Make an overhead of** Teacher Resource 10 **and model how to use your pencil to cross off the data to locate the median.**
- **Display** Teacher Resource 14: Clothes Pin Challenge. **Read out loud to the students and have them predict how many clothespins they think they can hold in one hand.**
- **Distribute** Student Resource 10: Clothes Pin Data **and have them record their prediction of how many clothespins they think they can hold.**
- **Split the students into groups. Distribute a hanger with clothes pins distributed all along the bottom of the hanger from one end to the other to each group.**
- **Students will take turns removing the clothespins with one hand placing the other hand behind their backs. Students will remove the clothespins until the first clothes pin drops from his or her hand he or she is gathering with. They will then identify the median for their group.**

Embedded Assessment

- Student Resource 10 Clothes Pin Data

Reteaching/Extension

- Reteaching: **Use** Student Resource 11 Reteaching **for students needing re-emphasis on median. Use** Teacher Resource 15 Reteaching Answer Key
- Extension: **Use** Student Resource 12 Finding the Median Using Even Data Set. **Use** Teacher Resource 16 Answer Key **to check.**
- See Teacher Resource 12.
- **Use Student Resource 13 also for reteaching. Answer key is on Teacher Resource 17.**

Summative Assessment:

Students will demonstrate an understanding of constructing a line plot given a set of data and analyzing that set of data. It will integrate the skills that have been taught in this unit. Using the data, students will be required to answer selected response questions and a BCR found on Student Resource 13. Answer key can be found on Teacher Resource 18.

Appendix A: Teacher Resources

- **Teacher Resource 1: Sample Line Plot of Jumping Jacks**

- **Teacher Resource 2: Examples of Line Plots Missing Elements Answer Key**
- **Teacher Resource 3: Answer Key for Exit Sticky**
- **Teacher Resource 4: Records Held in 15 Minutes**
- **Teacher Resource 5: Line Plot Observational Checklist**
- **2 Sticky Notes for each student Teacher Resource 6: Talking About Data Pre Assessment Answer Key**
- **Teacher Resource 7: Literature to Engage About Records**
- **Teacher Resource 8: Animal Sleep Chart.**
- **Teacher Resource 9: Identifying the Mode and Range Answer Key**
- **Judy Clocks**
- **Index cards Teacher Resource 10: Independent Practice Answer Key**
- **Teacher Resource 11: Smartie Data Paper Pencil Strategy**
- **Teacher Resource 12: Data Card for Extension**
- **Teacher Resource 13: Smarties World Record**
- **Teacher Resource 14: Clothes Pin Challenge**
- **Teacher Resource 15: Identifying the Median Answer Key**
- **Teacher Resource 16: Identifying the Median with an Even Data Set Answer Key**
- **Teacher Resource 17: Summative Assessment Answer Key**
- **Scissors**
- **Clothes Hanger and Wooden Clothes Pins**

Appendix B: Student Resources

- **Student Resource 1: Anticipation Guide**
- **Student Resource 2: Graph Paper**
- **Student Resource 3: Examples of Line Plots Missing/ Incorrect Elements**
- **Student Resource 4: Exit Sticky**
- **Students Resource 5: Collecting Data About Sleep**
- **Student Resource 6: Talking About Data Pre Assessment**
- **Student Resource 7: Independent Practice**
- **Student Resource 8: Identifying the Mode and the Range**
- **Student Resource 9: Data Cards**
- **Student Resource 10: Clothes Pin Data**
- **Student Resource 11: Identifying the Median**
- **Student Resource 12: Identifying the Median with an Even Data Set**
- **Student Resource 13: Summative Assessment**

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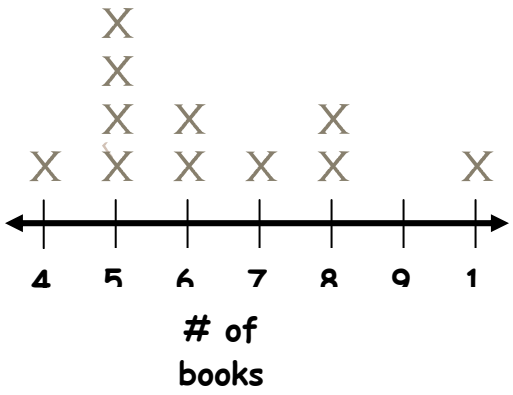
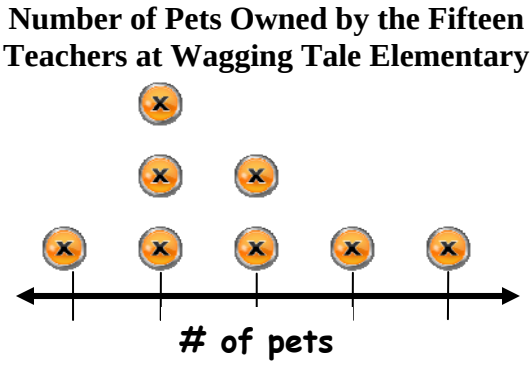
A Record-Breaking Anticipatory Guide

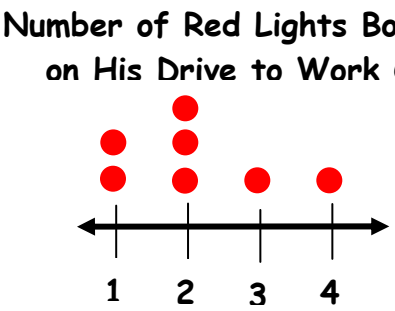
Directions: Read each statement. Decide whether you believe the statement is true or false. Write "TRUE" if the statement is true and "FALSE" if the statement is false.

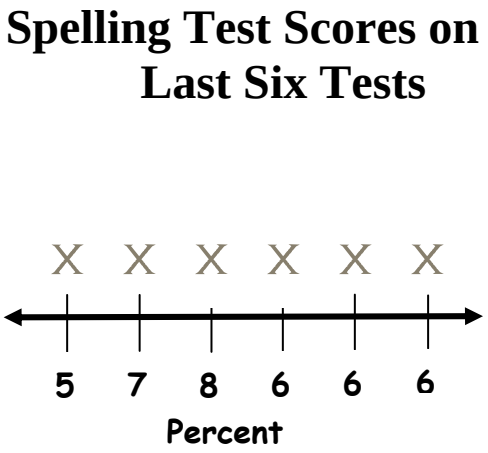
Before	Statement	After
	1. A typical **fourth grader can do 25 Jumping Jacks in 30 seconds.**	
	2. A giraffe spends an average **of 20 hours of its day asleep.**	
	3. The maximum **number of clothespins a student in our class can remove from a hanger with one hand is 7.**	
	4. Most **students in our class get 9 hours of sleep a night.**	
	5. Creating line plots **are fun!**	

Examples of Line Plots with Missing/ Incorrect Elements









Exit Sticky

Fifteen students recorded the number of times they jumped rope in one minute:

45, 39, 46, 41, 43, 45, 46, 40, 46, 47, 41, 46, 47, 43, 39

Create a line plot to display their data.

Exit Sticky

Fifteen students recorded the number of times they jumped rope in one minute:

45, 39, 46, 41, 43, 45, 46, 40, 46, 47, 41, 46, 47, 43, 39

Create a line plot to display their data.

Name: _____

Date: _____

Collecting Data about Sleep

Complete the following questions AT HOME**:**

1. Record the time you go to bed tonight. _____

2. Record the time you woke up this morning. _____

Complete the following questions DURING CLASS **tomorrow:**

1. Round the time you went to bed to the nearest hour. _____

2. Round the time you woke up to the nearest hour. _____

3. Beginning with the time you went to bed, use the Judy Clock to help you determine the amount of hours you slept. Record the number of hours you slept on the line below.

_____ hours

4. In the space below, record the numbers of hours for each member of your class. You will use this data to construct a class line plot.

_____

_____

_____

_____

Talking About Data: Pre-Assessment

1. Eleven students from Mr. Records' fourth grade class wanted to win the Class Fingernail Contest. After two weeks, the students measured the length of their longest nail. Their measurements are listed below in millimeters.

13, 18, 14, 21, 14, 14, 18, 17, 22, 23, 14

a. Create a line plot using the data above. Be sure to include all the elements of a line plot.

b. Use the line plot to identify the following measures of center:

minimum: _____

maximum: _____

range: _____

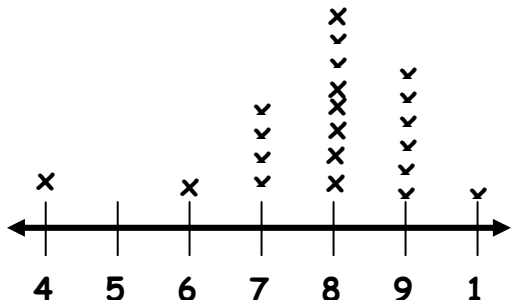
mode: _____

Name: _____

Independent Practice

Directions: Use the data below and answer the following questions.

Data from Our Rival Fourth Grade Class



1. Identify the mode for this set of data. _____

2. Looking at the data, what conclusions can you make about the amount of sleep the other class gets?

_____

_____

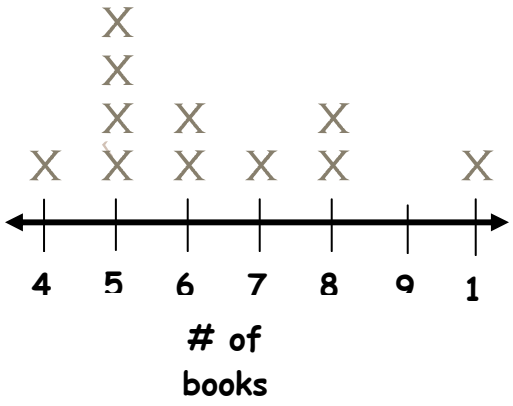
_____

_____

_____

Identifying the Mode and the Range

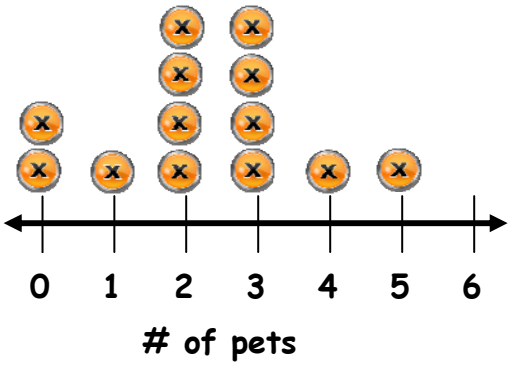
Number of Books Our Class Read Over the Summer



What is the mode? _____

What is the range? _____

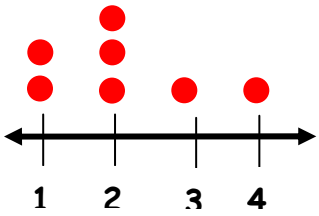
Number of Pets Owned by the Fifteen Teachers at Wagging Tale Elementary



What is the mode? _____

What is the range? _____

Number of Red Lights Bozo Hits on His Drive to Work Over

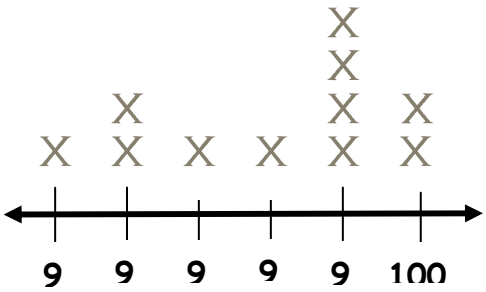


Number of red lights

What is the mode? _____

What is the range? _____

Math Facts Test Scores on My Last Six Tests



What is the mode? _____

What is the range? _____

Data Cards

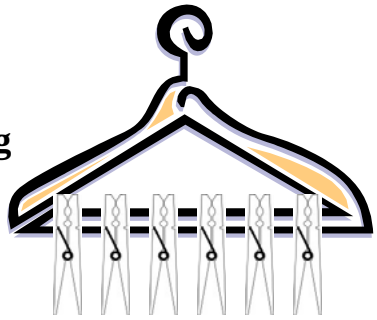
Directions: Cut out each number card along the lines. With your partner, decide how to use these cards to find the exact middle value for this set of data.

22	23	27
26	29	25
29	24	29
25	30	30
25		

Clothes Pin Data

Predict!

I predict that I will be able to hold _____ clothespins in one hand.



Experiment Directions:

Step 1: Clip as many clothespins as you can along the bottom of the clothes hanger.

Step 2: Assign the "Hanger Holder" role to the youngest member of your group.

Step 3: List the names of each member in your group on the chart below.

Step 4: Each member of the group will get a turn to gather as many clothespins as he or she can. When gathering the clothespins, one hand must be behind your back. The other hand will be used to unclip and hold the clothespins. Continue unclipping until the first clothespin drops from your hand. Count the number of clothespins you are holding after the first one drops and record your total on the chart below. Record the total number for each member in your group.

Name of Group Member	Total number of Clothespins Held

Step 5: On the line below, list the data from the chart in sequential order.

_____

Step 6: Use the pencil-paper strategy to determine the median for your group's set of data.
The median is _____ clothespins.

Step 7: Reflect! How does your group compare to the Guinness Book of World Record Holder amount of 22 clothespins? Suppose you added Elliott (the record holder) to your group and he held 22 clothespins again.

A. Would your median value change? yes or no

B. Explain your answer on the lines below.

_____

_____

_____

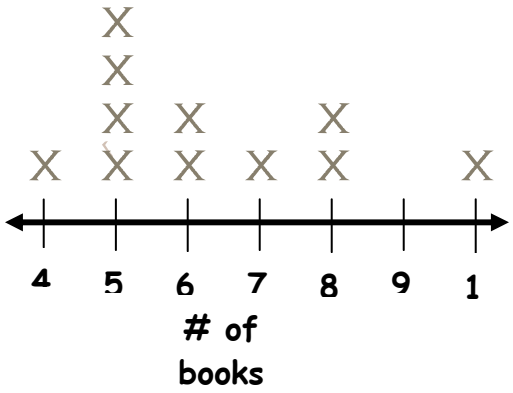
_____

_____

_____

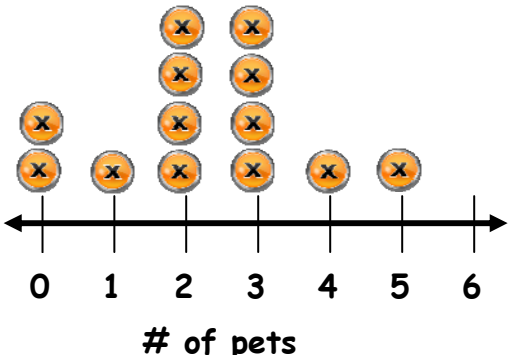
Identifying the Median

Number of Books Our Class Read Over the Summer



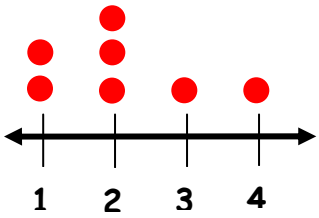
What is the median? _____

Number of Pets Owned by the Fifteen Teachers at Wagging Tale Elementary



What is the median? _____

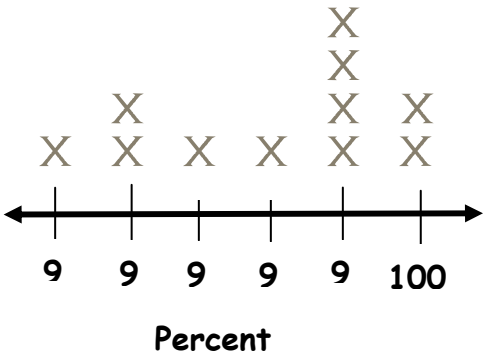
Number of Red Lights Bozo Hits on His Drive to Work Over



Number of red lights

What is the median? _____

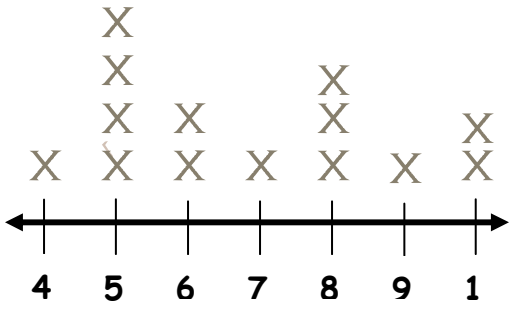
Math Facts Test Scores on My Last Six Tests



What is the median? _____

Identifying the Median with an Even Data Set

Number of Books Our Class Read Over the Summer



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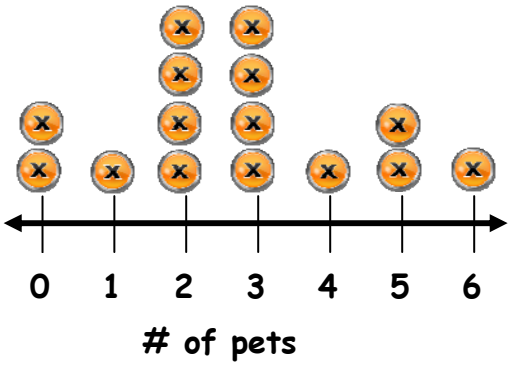
Number of Pets Owned by the Fifteen Teachers at Wagging Tale Elementary



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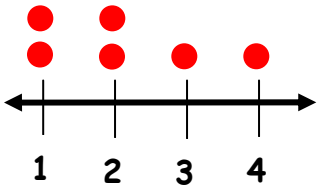
Number of Red Lights Bozo Hits on His Drive to Work Over



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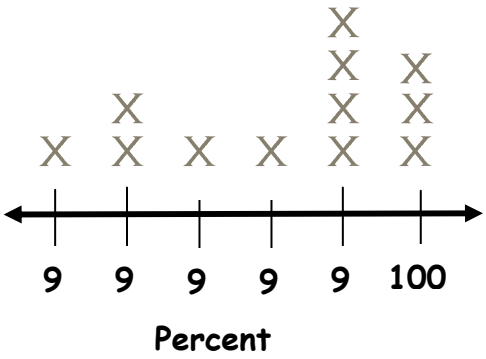


What is the median? _____

Name: _____

How Many Spoons Can You Balance on Your Face?

and other curiosities

A Summative Assessment

Did you know . . .

Tim Johnston, a fifteen-year-old American, was able to balance 15 stainless steel spoons on his face. He hung one from each ear, two on each cheek (one on each ear, three on his chin, two on his lips, one on his nose and three on his forehead. He balanced them for 30 seconds at Havens High School in Piedmont, California on May 28, 2004.

Students from Scoop Elementary School tried to break Tim Johnston's record. Here is a list of the fifteen highest scores from Mr. Steel's fourth grade class.

8, 7, 10, 6, 9, 7, 7, 7, 8, 13, 9, 6, 7, 8, 9

In the space below, use the data to create a line plot.

Selected Response Questions

Use the following set of data for selected response questions 1 and 2.

Twelve kids entered a Miniature Rubber Band Shooting Contest. They measured how far the rubber bands from their braces traveled to the nearest inch. Here are the results:

10, 15, 5, 14, 6, 4, 8, 11, 7, 5, 12, 14

1. What is the range for this set of data?

A. 11
B. 5
C. 4
D. 9

2. What is the median for this set of data?

A. 11
B. 5
C. 4
D. 9

3. Guadelupe counted the number of Jumping Jacks seven of his classmates jumped in thirty seconds. The results are shown below.

20, 12, 25, 22, 18, 21, 16

What is the median of her data set?

A. 12
B. 20
C. 18
D. 19

4. Mandy organized an Oreo Stacking Contest during lunch. Ten friends stacked Oreos until their Oreo towers crumbled. They recorded the number of cookies in each tower before they fell. The results are shown below.

84, 88, 86, 82, 82, 85, 86, 80, 84, 86

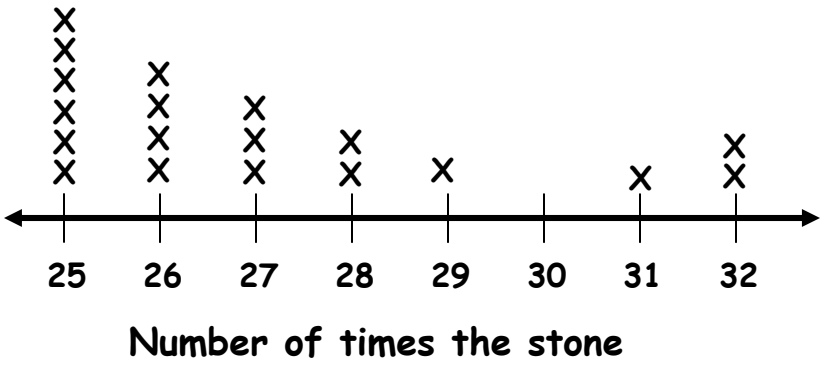
What is the mode of her set of data?

A. 82
B. 80
C. 88
D. **86**

Brief Constructed Response

Kurt Steiner from Pennsylvania holds the World Record for Stone Skipping. He skipped a stone 40 times! The Stone Skipping Club at Quartz Elementary School held a tournament hoping to come close to Kurt Steiner's World Record. Their data is on the line plot below.

Results of Quartz Elementary's Stone Skipping Contest



Step A: Find the median for this set of data.

_____

Step B: Use what you know about statistics to explain why your answer is correct. Use words and/or numbers in your explanation.

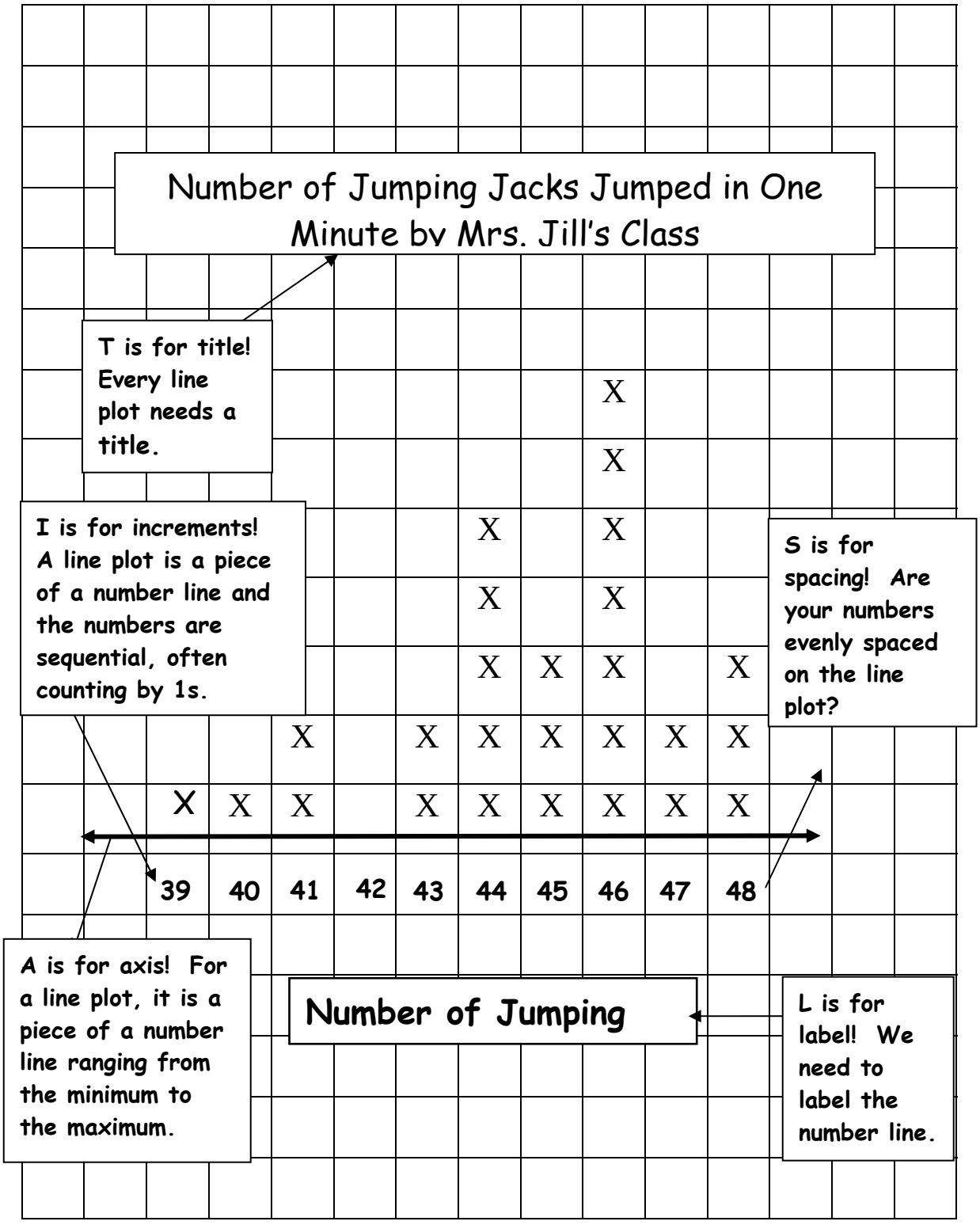
_____

_____

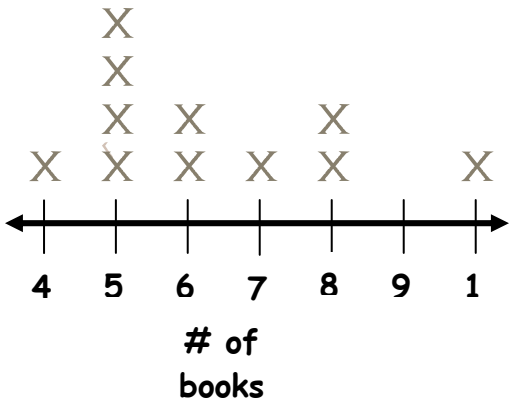
_____

_____

_____

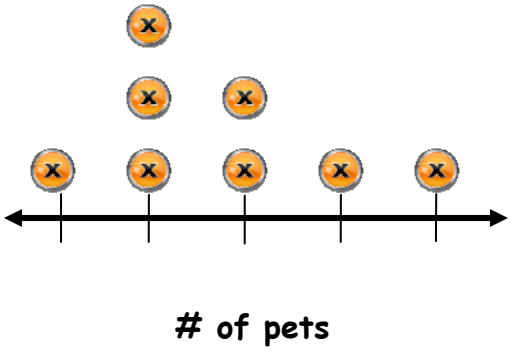

Number of Jumping Jacks Jumped in One Minute by Mrs. Jill's Class
T is for title! Every line plot needs a title.
I is for increments! A line plot is a piece of a number line and the numbers are sequential, often counting by 1s.
S is for spacing! Are your numbers evenly spaced on the line plot?
A is for axis! For a line plot, it is a piece of a number line ranging from the minimum to the maximum.
Number of Jumping
L is for label! We need to label the number line.
39 40 41 42 43 44 45 46 47 48

Examples of Line Plots with Missing/ Incorrect Elements: Answer Key



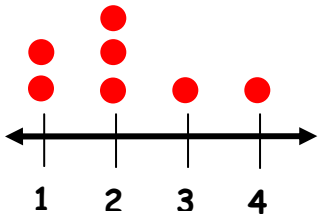
Missing Element: Title
(possible title: Number of Books Our Class Read Over the

Number of Pets Owned by the Fifteen Teachers at Wagging Tale Elementary



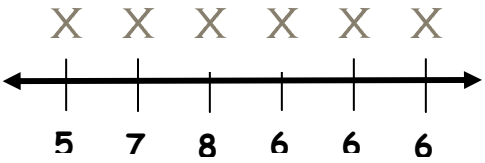
Missing Element: Numbers along the X-Axis

Number of Red Lights Bozo Hits on His Drive to Work Over



Missing Element: Label for x-axis

Spelling Test Scores on My Last Six Tests



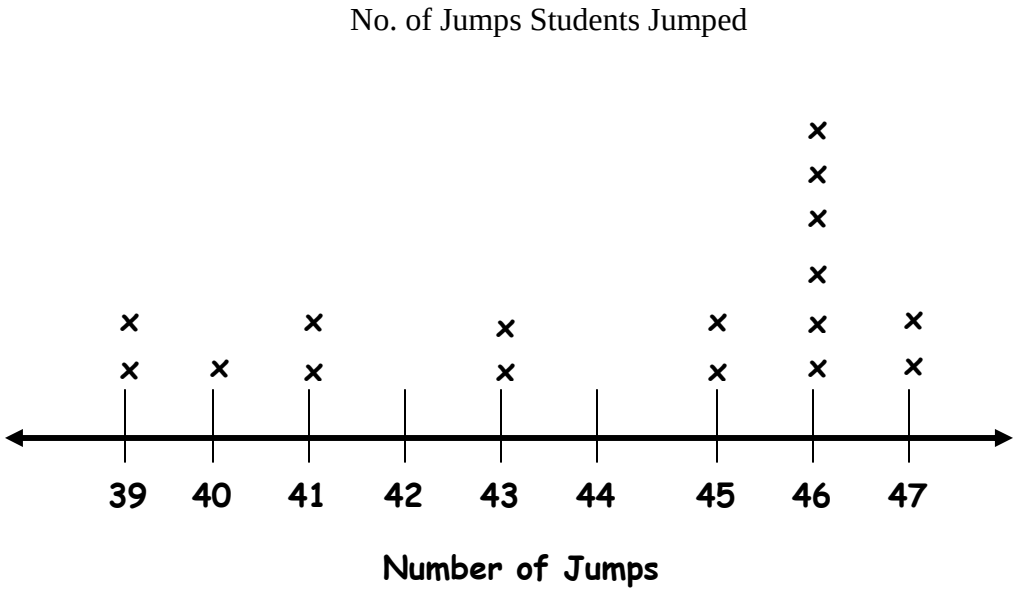
Incorrect Number Sequence
(The x-axis has not been labeled in sequential order and

Exit Sticky- Answer Key

Fifteen students recorded the number of times they jumped rope in one minute:

45, 39, 46, 41, 43, 45, 46, 40, 46, 47, 41, 46, 47, 43, 39

Create a line plot to display their data.



On September 3, 2000, Bill Kathan, Jr. made 1,454 nonstop jumping jacks in 15 minutes!

About how many would that be in one minute?

In thirty seconds?

Line Plot Observation Checklist

Student's Name	Identifies a line plot as a way to display data.	Creates line plot including all elements.	Identifies minimum, maximum, and range.	Correctly identifies mode.	Correctly identifies median.	Draws conclusions from a set of data.

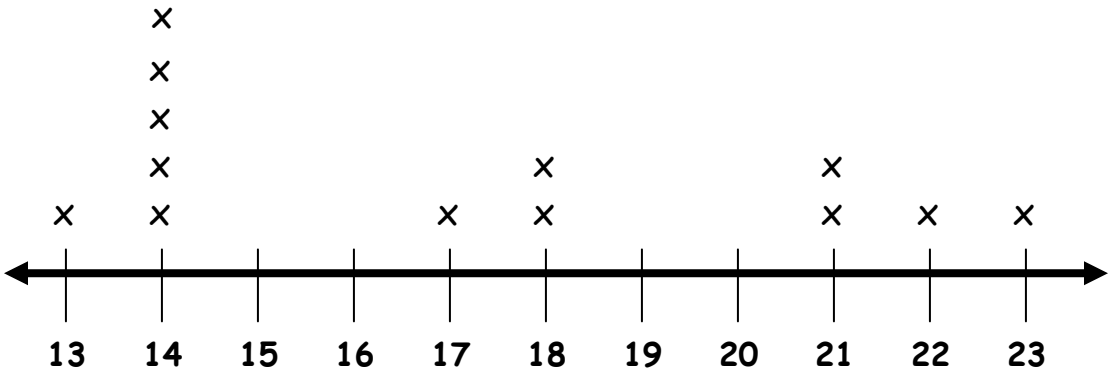
Talking about Data: Pre-Assessment Answer Key

1. Eleven students from Mr. Records' fourth grade class wanted to win the Class Fingernail Contest. After two weeks, the students measured the length of their longest nail. Their measurements are listed below in millimeters.

18, 13, 14, 21, 14, 14, 18, 17, 22, 23, 14

Create a line plot using the data above. Be sure to include all the elements of a line plot.

Length of Eleven Students' Fingernails



Length in Millimeters

b. Use the line plot to identify the following measures of center:

minimum: 13

maximum: 23

range: 10

mode: 14

Literature to Engage Students About Records

The Very Sleepy Sloth (Paperback)
by Andrew Murray (Author), Jack Tickle (Illustrator)

Dr. Seuss's Sleep Book (Classic Seuss) (Hardcover)
by Dr. Seuss (Author) "The news Just came in From the Country of Keck That a very small bug By the name of Van Vleck Is yawning so wide..." (more)

Guinness Book of World Records

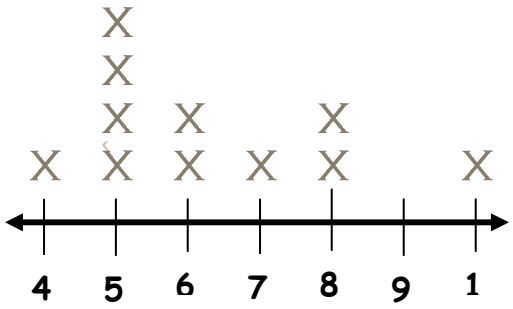
Animal Sleep Chart

Species	Average Sleep Time Per Day
Brown Bat	**20 hours**
Python	**18 hours**
Human (infant)	**16 hours**
Western Toad	**15 hours**
Ferret	**15 hours**
Three-Toed Sloth	**14 hours**
Jaguar	**11 hours**
European Hedgehog	**10 hours**
Guppy (fish)	**7 hours**
Human (elderly)	**6 hours**
African Elephant	**3 hours**
Giraffe	**2 hours**

Information from: **http://www.nasaexplores.com/show2_articlea.php?id=02-008**

Identifying the Mode and the Range: ANSWER KEY

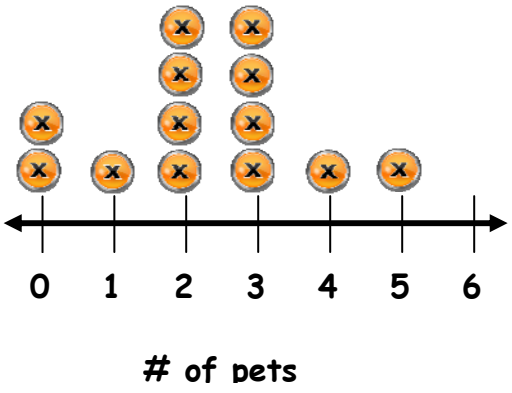
Number of Books Our Class Read Over the Summer



What is the mode? 5

What is the range? 6

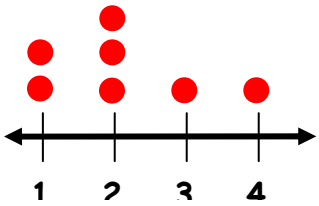
Number of Pets Owned by the Fifteen Teachers at Wagging Tale Elementary



What is the mode? 2, 3 (It is dual modal.)

What is the range? 5

Number of Red Lights Bozo Hits on His Drive to Work Over

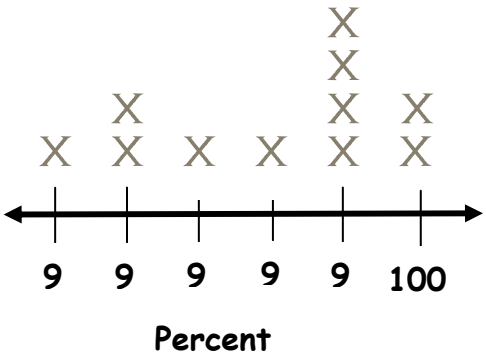


Number of red lights

What is the mode? 2

What is the range? 3

Math Facts Test Scores on My Last Six Tests



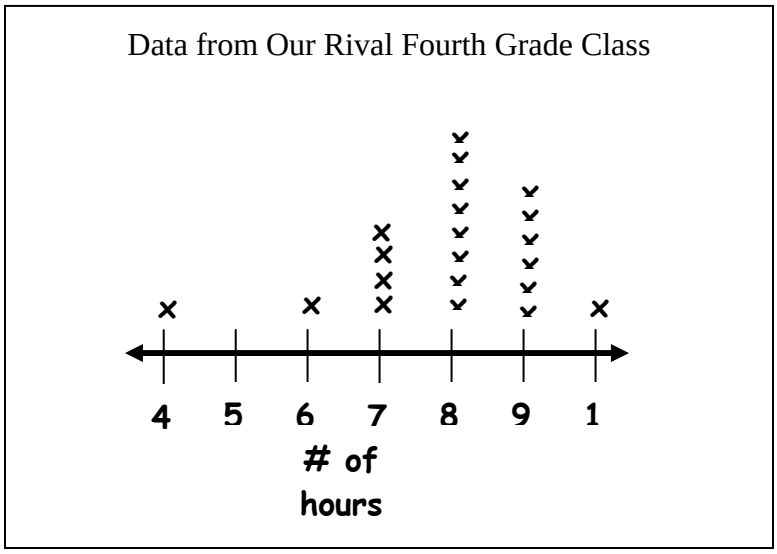
What is the mode? 99

What is the range? 5

Name: _____

Independent Practice: Answer Key

Directions: Use the data below and answer the following questions.



1. Identify the mode for this set of data. 8

2. Looking at the data, what conclusions can you make about the amount of sleep the other class gets?

The most common number of hours students sleep is 8 hours a day. I know this because the mode for this set of data is 8. The maximum number of hours a student slept last night was 10 hours. The minimum number of hours a student slept last night was 4 hours. The data is clustered between 7 and 9. This tells me that most students slept between 7 and 9 hours. According to recommendations for the amount of sleep a 9 or 10 year old should get their class is not getting enough. According to the data, most students are getting less than 9 hours of sleep.

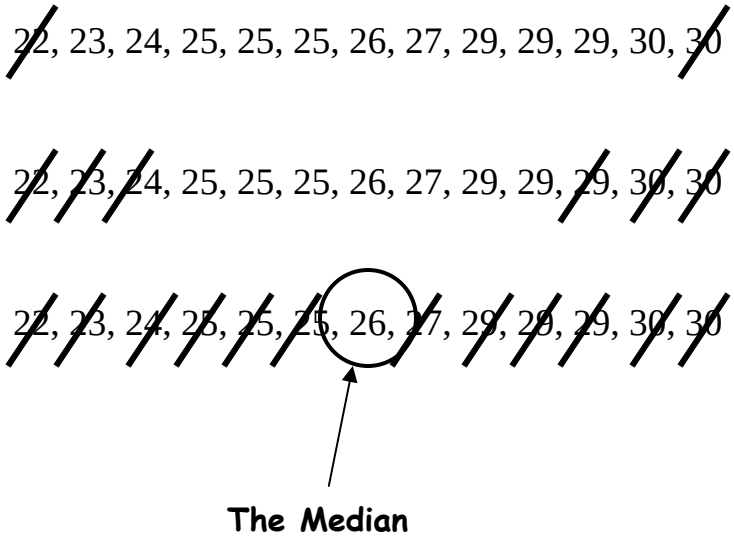
Fourth Grade Smarties Data

22, 23, 27, 26, 29, 25, 29, 24, 29, 25, 30, 30, 25

Step 1: **Put the numbers in order.**

22, 23, 24, 25, 25, 25, 26, 27, 29, 29, 29, 30, 30

Step 2: **Cross off the data beginning with the minimum and maximum values. Continue crossing off one number from the left, one from the right, until you have reached the middle or median value.**



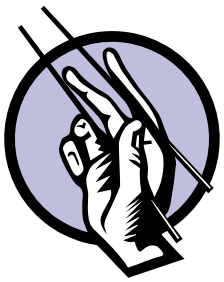
Data Card – For Extension

Directions for teacher**: Keep a handful of this extra number. For pairs of students who are able to quickly find the median with 13 numbers – give them one more and see if they can find the median with an even number.**

29	**29**	**29**
29	**29**	**29**
29	**29**	**29**
29	**29**	**29**
29	**29**	**29**
29	**29**	**29**

- **Using chopsticks, Kathryn Ratcliffe from the United Kingdom ate 170 Smarties in three minutes at the Guinness World Records 2005 Roadshow at The Trafford Centre, Manchester, Lancashire on November 27, 2004.**

- **How many Smarties would that be in a minute?**



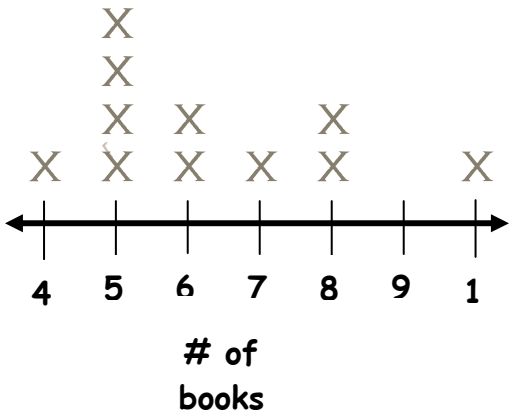
The most clothespins a person has picked off a washing line and held in a single hand is 22 achieved by Elliott Howes (UK) at Newbury, Berkshire, UK, on 9 July 2005.

He was able to maneuver the pegs and prevent them dropping without touching any part of his body other than his nominated hand.

How many clothespins will *you* be able to pick off and hold in one hand?

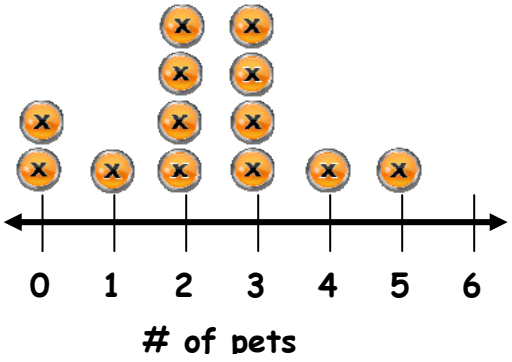
Identifying the Median – ANSWER KEY

Number of Books Our Class Read Over the Summer



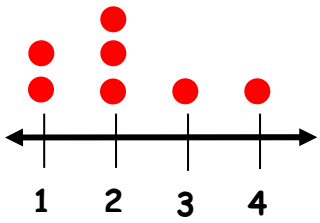
What is the median? 6

Number of Pets Owned by the Fifteen Teachers at Wagging Tale Elementary



What is the median? 2

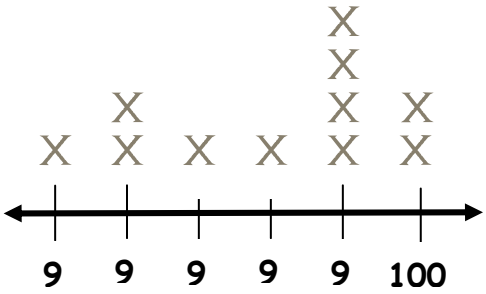
Number of Red Lights Bozo Hits on His Drive to Work Over



Number of red lights

What is the median? 2

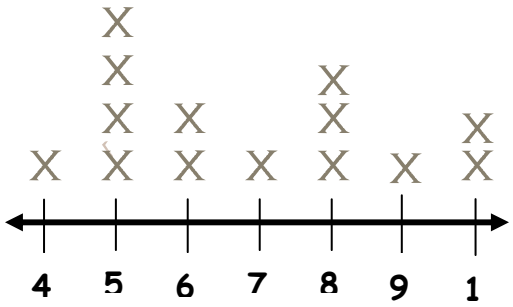
Math Facts Test Scores on My Last Six Tests



What is the median? 99

Identifying the Median with an Even Data Set – ANSWER KEY

Number of Books Our Class Read Over the Summer



What is the median? 6.5

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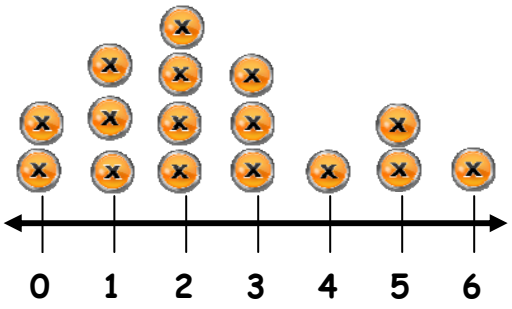

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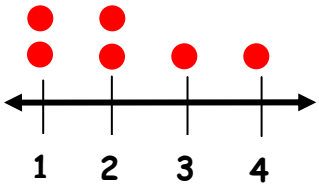
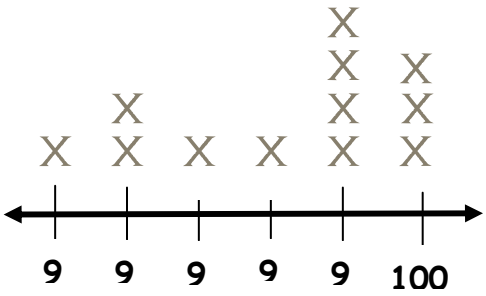


What is the median? 2

Math Facts Test Scores on My Last Six Tests



What is the median? 99

Name: _____

How Many Spoons Can You Balance on Your Face?

and other curiosities

A Summative Assessment – ANSWER KEY

Did you know . . .

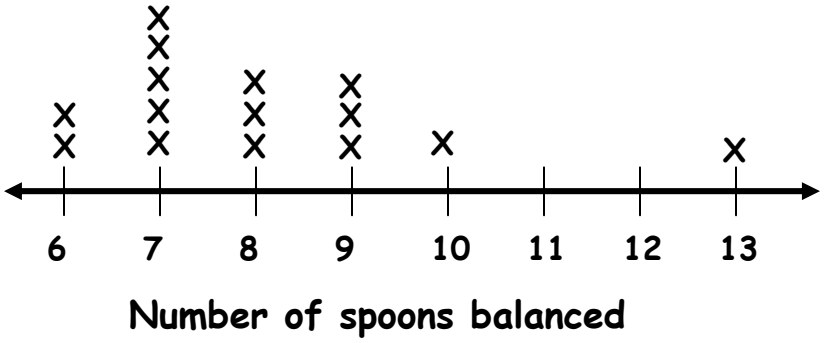
Tim Johnston, a fifteen-year-old American, was able to balance 15 stainless steel spoons on his face. He hung one from each ear, two on each cheek (one on each ear, three on his chin, two on his lips, one on his nose and three on his forehead. He balanced them for 30 seconds at Havens High School in Piedmont, California on May 28, 2004.

Students from Scoop Elementary School tried to break Tim Johnston's record. Here is a list of the fifteen highest scores from Mr. Steel's fourth grade class.

8, 7, 10, 6, 9, 7, 7, 7, 8, 13, 9, 6, 7, 8, 9

In the space below, use the data to create a line plot.

Number of Spoons Balanced on Fifteen Faces



Selected Response Questions

Use the following set of data for selected response questions 1and 2.

Twelve kids entered a Miniature Rubber Band Shooting Contest. They measured how far the rubber bands from their braces traveled to the nearest inch. Here are the results:

10, 15, 5, 14, 6, 4, 8, 11, 7, 5, 12, 14

1. What is the range for this set of data?

A. 11*
B. 5
C. 4
D. 9

2. What is the median for this set of data?

A. 11
B. 5
C. 4
D. 9*

3. Guadelupe counted the number of Jumping Jacks seven of his classmates jumped in thirty seconds. The results are shown below.

20, 12, 25, 22, 18, 21, 16

What is the median of her data set?

A. 12
B. 20*
C. 18
D. 19

4. Mandy organized an Oreo Stacking Contest during lunch. Ten friends stacked Oreos until their Oreo towers crumbled. They recorded the number of cookies in each tower before they fell. The results are shown below.

84, 88, 86, 82, 82, 85, 86, 80, 84, 86

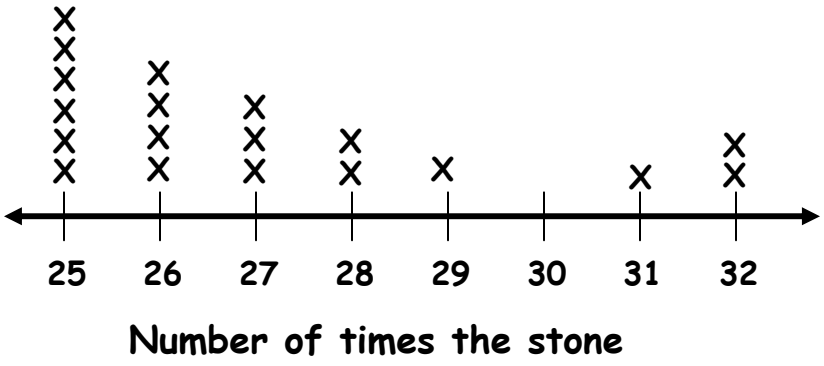
What is the mode of her set of data?

A. 82
B. 80
C. 88
D. 86*

Brief Constructed Response

Kurt Steiner from Pennsylvania holds the World Record for Stone Skipping. He skipped a stone 40 times! The Stone Skipping Club at Quartz Elementary School held a tournament hoping to come close to Kurt Steiner's World Record. Their data is on the line plot below.

Results of Quartz Elementary's Stone Skipping Contest



Step A: Find the median for this set of data.

26

Step B: Use what you know about statistics to explain why your answer is correct. Use words and/or numbers in your explanation.

I know I am correct because the median is the exact center or middle number in a set of data. I found the middle number by lining up each number in order from least to greatest – 25, 25, 25, 25, 25, 25, 26, 26, 26, 26, 27, 27, 27, 28, 28, 29, 31, 32, 32. I crossed one number from the left, then one number from the right until there was only one number left in the middle. The number left was 26. It is the middle number so it is the median.